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Patent claims

*asd 987* 5  
1. System for inspecting matt, flat and/or slightly curved surfaces in order to identify defects which are associated with a modification of the course of the surface, in particular for examining matt unlacquered shell bodywork, in which system an illumination device (2) irradiates the surface (3) to be inspected at flat

10 angles, said device having the following combined features:

the illumination device (2) is formed from a plurality of elongated luminous surfaces (5) which are disposed substantially parallel to one another,

15 the angle between the normal line of an inspected surface element on the surface and the connecting line between the inspected surface element and a point on one of the elongated luminous surfaces (5) is greater than approximately 60°,

20 the light distribution of the respective elongated luminous surfaces is tightly concentrated in planes which lie transversely with respect to the longitudinal direction of the respective surface, with an aperture angle which is smaller than 15°, in such a way that a

25 substantially sheet-type light distribution is produced which covers the surface portion to be inspected, and the observer (4) is located within or at least in the proximity of the angle predetermined by reflection of the light radiated by the at least one elongated

30 luminous surface on the surface portion to be inspected.

2. System according to claim 1, **characterised in that** the aperture angle of the sheet-type light distribution is smaller than 5°, preferably smaller than 2°.

3. System according to claim 1 or claim 2,  
**characterised in that** the angle between the normal line  
of an inspected surface element and the incident light  
ray of the elongated luminous surface is greater than  
5 75°.

4. System according to one of claims 1 to 3,  
**characterised in that** the longitudinal direction of the  
luminous surfaces (5) is substantially parallel to the  
longitudinal direction of the surface (3) to be  
10 inspected which is illuminated by this luminous  
surface.

5. System according to one of claims 1 to 4,  
**characterised in that** each surface portion to be  
inspected is illuminated by at least one elongated  
15 luminous surface (5) from its entire length and  
breadth.

6. System according to one of claims 1 to 5,  
**characterised in that** the luminous elongated surfaces  
(5) so disposed beside one another are so arranged in  
20 respect of their concentration that they illuminate  
adjacent surfaces to be inspected in the same  
alignment.

7. System according to one of claims 1 to 6,  
**characterised in that** the illumination device (2) has a  
25 light-radiating original surface (11, 15) which has a  
substantially uniform luminance distribution and in  
that there is arranged in front of this original  
surface a plurality of lamellae (13) which are  
30 substantially parallel to one another and which  
determine the desired aperture angle on the basis of  
their geometry.

8. Illumination device according to claim 7,  
**characterised in that** the surfaces of the lamellae (13)

have a high reflection factor of the directed reflection at flat light entrance angles, and at steep light entrance angles reflect predominantly in a diffuse manner.

5 9. System according to claim 7 or 8, **characterised in that** the surface of the lamellae (13) is black.

10. System according to one of claims 7 to 9, **characterised in that** the gaps between the lamellae (13) are filled with a light-guiding transparent 10 medium, and in that the surface of the lamellae (13) is connected to the medium in an optically dense manner at least on one side.

11. System according to one of claims 1 to 10, **characterised in that** the observer is a person, a 15 camera or some other sensor arrangement for capturing an image.

12. System according to one of claims 1 to 10, **characterised in that** the light-radiating original surface radiates at a solid angle which is greater than 20 the solid angle of the radiation of the luminous surfaces (5).

13. System according to one of claims 1 to 12, **characterised in that** the illumination device has at least one elongated light source (12, 14), the light 25 distribution of which radiates widely in planes parallel to its axis.

14. System according to one of claims 1 to 13, **characterised in that** the original surface (12) is composed of a plurality of widely radiating, elongated 30 light sources which are disposed beside one another, at least one pair of lamellae (13) being placed in front of each light source.

15. System according to one of claims 1 to 13, **characterised in that** the original surface is formed from at least one elongated light source (14) with a trough-like reflector (15).

5 16. System according to one claims 1 to 13,  
**characterised in that** the position of the observer can  
be altered by optical measures such as mirrors, retro-  
reflective materials or prisms.

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